

REMARKS

I. Introduction

By the present Amendment, claims 1 and 16 have been amended. No claims have been added or cancelled. Accordingly, claims 1, 2, 6, 8, 9, 12, and 16-24 remain pending in the application. Claims 1, 19, 21, and 23 are independent.

II. Office Action Summary

In the Office Action of March 17, 2009, claim 1 was rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. Claim 16 was rejected under 35 USC §112, second paragraph, as being indefinite. Claims 1, 8, 9, 12, and 16-18 were rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 5,517,994 issued to Burke et al. ("Burke"). Claim 2 and 6 were rejected under 35 USC §103(a) as being obvious over Burke in view of U.S. Patent No. 6,602,196 issued to Suzuki et al. ("Suzuki"). These rejections are respectfully traversed.

III. Objections under 35 USC §112

Claim 1 was rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. Regarding this rejection, the Office Action indicates that the claim contains subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors had possession of the claimed invention at the time the application was filed. In particular, the Office Action indicates that the new matter "suppressing the quantity of the drive signals" is not supported by the Specification.

By the present Amendment, Applicants have amended independent claim 1 to delete this limitation, thereby rendering this particular ground of rejection.

Withdrawal of this rejection is therefore respectfully requested.

Claim 16 was rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action indicates that the limitation "the set value" lacks sufficient antecedent basis.

By the present Amendment, Applicants have amended claim 16 to depend from claim 8. Claim 8 recites, in part, "a set value" thereby providing proper antecedent basis for the language of claim 16.

Withdrawal of this rejection is therefore respectfully requested.

IV. Rejections under 35 USC §102

Claims 1, 8, 9, 12, and 16-18 were rejected under 35 USC §102(b) as being anticipated by Burke. Regarding this rejection, the Office Action indicates that Burke discloses an ultrasonic diagnostic system capable of performing self diagnostic tests on the system processing and control channels coupled to the transducer element of an ultrasonic probe. The Office Action indicates Burke's system includes a probe, a diagnostic processor coupled to a number of subsystems, a beamformer, and an image-and-Doppler processor. The image-and-Doppler processor processes digital echo signals to form an image or to make a diagnostic measurement such as velocity of blood flow in the subject's body. The resultant image or measurement can be displayed on a display. The Office Action further alleges that Burke discloses a judging section which allows the diagnostic processor to monitor the probe-air

interface by performing self diagnostic tests and adjusting operating characteristics of the system electronics. Applicants respectfully disagree.

As amended, independent claim 1 defines an ultrasonic diagnostic apparatus that comprises:

- a probe that transmits/receives ultrasonic waves to/from a test subject;
 - a transmitting section that supplies a drive signal to the probe;
 - a receiving section that receives a reflection echo signal outputted from the probe;
 - an image constructing section that reconstructs a diagnostic image on the basis of the received reflection echo signal;
 - a display section that displays the diagnostic image constructed by the image constructing section; and
 - a control section that controls these sections,
- wherein the ultrasonic diagnostic apparatus includes a judging section that judges, on the basis of the diagnostic image information, that the probe is left in the air, and when the judging unit judges that the probe is left in the air, the control section controls the drive signals supplied to the probe from the transmitting section so as to suppress a rise in the temperature of the probe.

The ultrasonic diagnostic apparatus of independent claim 1 includes a probe that transmits/receives ultrasonic waves to/from a test subject, a transmitting section that supplies a drive signal to the probe, a receiving section that receives a reflection echo signal output from the probe, an image constructing section that reconstructs a diagnostic image based on the received reflection echo signal, and a display section that displays the diagnostic image constructed by the image constructing section. The ultrasonic diagnostic apparatus also includes a control section that controls the probe, transmitting section, receiving section, image reconstructing section, and display section. According to independent claim 1, a judging section is provided to

determine whether the probe is left in the air based on the diagnostic image information. If the probe is determined to have been left in the air, the control section controls the drive signals supplied to the probe from the transmitting section in order to suppress a rise in the temperature of the probe.

Burke discloses a system for testing the integrity of an ultrasonic transducer probe or the ultrasound system connected to the probe. A diagnostic processor analyzes signals received from the probe to determine characteristics such as amplitude, time of echo reception, group delay, and other characteristics that would indicate problems such as faulty transducer elements or connections. The diagnostic processor is also capable of adaptively adjusting the operating characteristics of the system (e.g. gain or time delay) in order to compensate for a detected faulty condition. See Abstract and column 2, lines 45 to 67. Burke never discloses or addresses the problem of temperature rise in the probe, and never discloses a judging section, as in the present invention. Burke only describes the channels of the transducer elements being self-tested in the air. When this is done, a surface reflection is returned from the probe-air interface and received for processing. The characteristics of the received signals are used to provide various information regarding the condition of different channels connected to the probe. These conditions can subsequently be reported to a user or service personnel. See col. 1, lines 48-63. Burke simply fails to provide any disclosure for features recited in independent claim 1, such as:

wherein the ultrasonic diagnostic apparatus includes a judging section that judges, on the basis of the diagnostic image information, that the probe is left in the air, and when the judging unit judges that the probe is left in the air, the control section controls the drive signals supplied to the probe from the

transmitting section so as to suppress a rise in the temperature of the probe.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2, 6, 8, 9, 12, and 16-18 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

V. Rejections under 35 USC §103

Claims 2 and 6 were rejected under 35 USC §103(a) as being obvious over Burke in view of Suzuki. It also appears as though claims 19-24 have been rejected under the same grounds. Regarding this rejection, the Office Action indicates that Burke discloses an ultrasonic diagnostic apparatus that includes a diagnostic processor which plays the role of the judging section. The Office Action admits that Burke fails to specifically disclose more than one image-mode processor. Suzuki is relied upon for disclosing an ultrasonic imaging apparatus that includes a B-mode processor and a Doppler processor. A controller controls operation of the B-mode processor, Doppler processor, and CFM processor. The Office Action further alleges that Suzuki discloses the ultrasound imaging being based on established relationship between the sound-ray density, the scan range, and the frame rate.

Claims 2 and 6 depend from independent claim 1, and are believed to be allowable over the art of record.

Applicants note, however, that Burke only describes the channels of the transducer elements being self-tested in the air. When this is done, a surface reflection is returned from the probe-air interface and received for processing. The

characteristics of the received signals are used to obtain various information regarding the condition of different channels connected to the probe. There is no disclosure or suggestion for a judging section as set forth in independent claim 1. Furthermore, Applicants' review of Suzuki has also failed to reveal any disclosure or suggestion for such features.

Independent claims 19, 21, and 23 each define an ultrasonic diagnostic apparatus that includes features somewhat similar to those recited in independent claim 1. In particular, a control section is provided for suppressing the quantity of the drive signals supplied to the probe from the transmitting section when the judging unit determines that the probe is left in the air. As previously discussed, this particular feature is not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claims 19, 21, and 23 are allowable over the art of record.

Claims 20, 22, and 24 depend from claims 19, 21, and 23, respectively, and are therefore believed allowable for at least the reasons set forth above with respect to these claims.

VI. Conclusion


For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 520.45475X00).

Respectfully submitted,
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